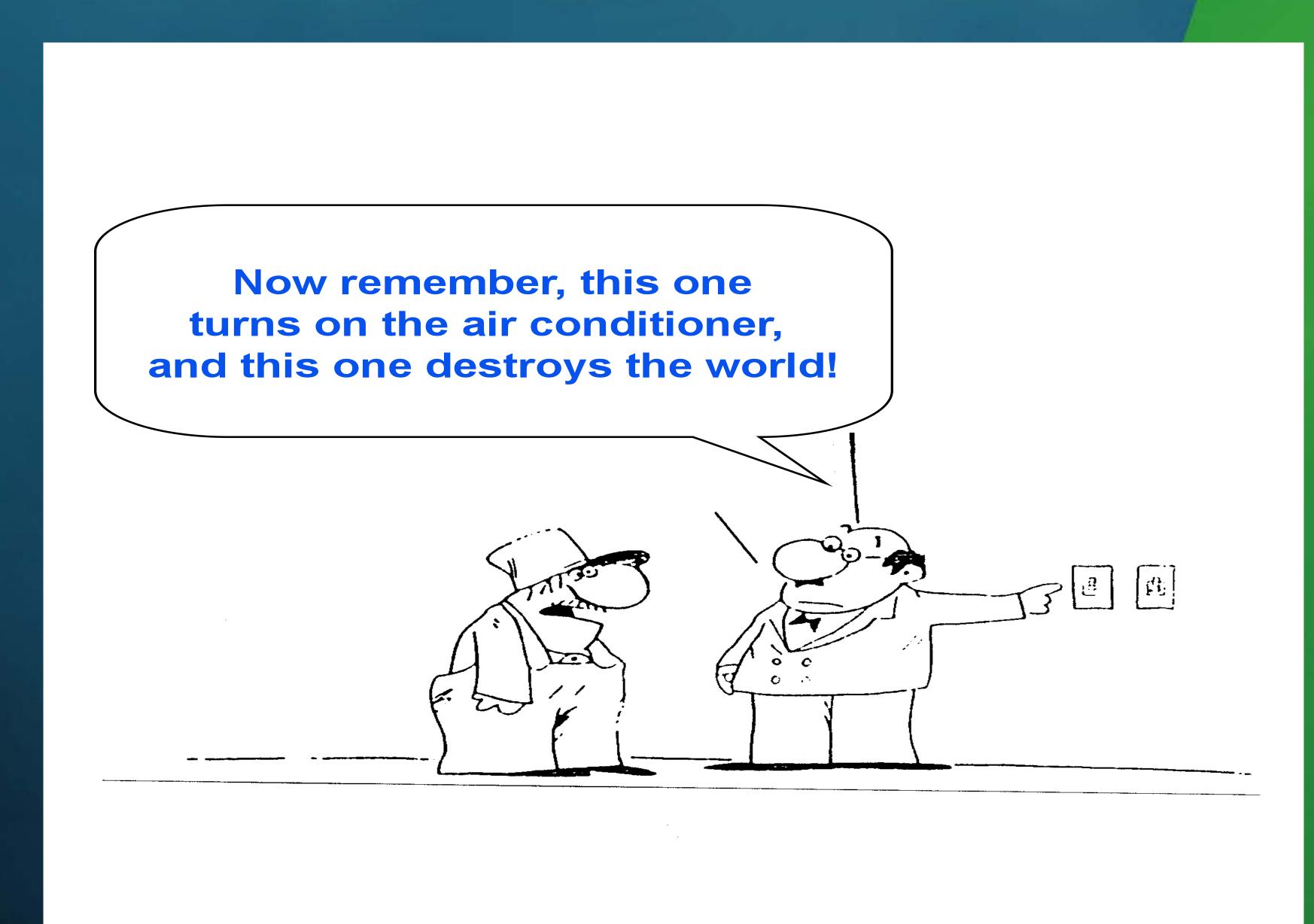


Office of Nuclear Regulatory Research

The U.S. NRC's Office of Nuclear Regulatory Research initiated the research program, "Human Performance for Advanced Control Room Design," to systematically address human performance topics that may impact plant safety.

The goal of the program is to provide technical bases, guidelines, methods, and assessment tools to facilitate the NRC's safety and licensing activities for highly automated, new and advanced reactor control rooms.

The World Without Human Factors



Human Factors for Advanced Technologies

NPP Functions are Achieved by Systems and Humans

- The potential for human error is a significant contributor to Core Damage Frequency
- Risk increases notably if human performance degrades
- Human performance is important to the mitigation of and recovery from failure conditions

Human Factors Activities in NPP

Using combinations of engineering, physiology, and cognitive psychology methods to maintain and enhance human performance to maintain safety

Current Research Activities

- Updating Human Factors Engineering (HFE) Review Guidelines (NUREG-0700/0711)
- Updating HFE Methods and Tools
- Human Factors Aspects in Concept of Operations of Modular Design
- Computerized Procedures
- Roles of Automation and Personnel
- Human System Interface Complexity and Opacity Workload, Situational Awareness, and Teamwork
- Staffing Verification and Evaluation for Advanced Control Room Designs

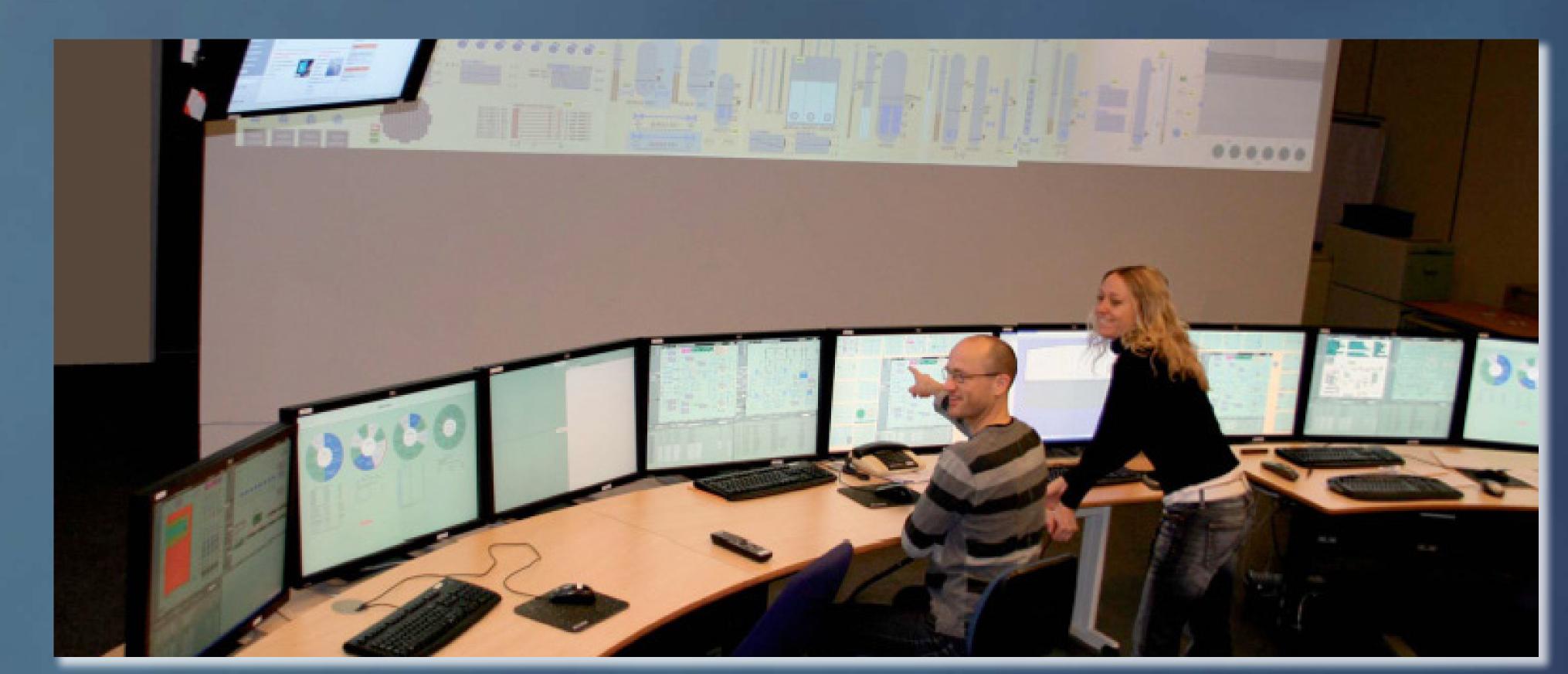
Examples of Changes in Advanced Control Room Designs

- Automation
- Computerized interfaces
- Advanced information displays
- Computer-based procedures
- Passive systems
- Modular operations

Examples of Challenges in Advanced Designs

- What methods and criteria should be applied in evaluating the acceptability of new technologies?
- What are the most safety-significant human performance implications of new concepts of operations?
- What is the impact of increased complexity in new technologies on human performance?
- How do the roles of humans and automation affect performance?
- Will computerized interfaces adversely impact teamwork?

Advanced Control Room



Current Halden Simulator

Knowledge for Today and Tomorrow

Idaho National Laboratory